Philips Series 50 XM and Series 50 XMO Fetal/Maternal Monitors

Quick Operating Guide

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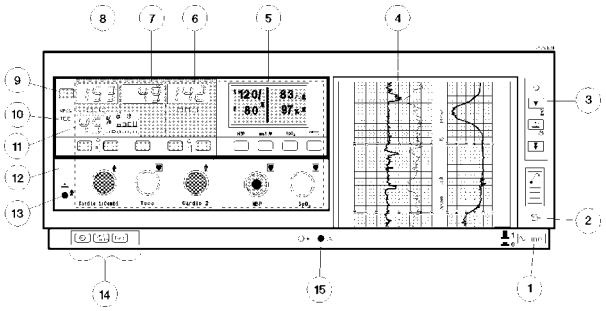
About This Guide

This guide is for experienced Philips Series 50 XM and Philips Series 50 XMO users.

It tells you how to monitor fetal heart rate, uterine activity, fetal pulse oximetry ($FSpO_2$) and maternal parameters such as ECG, NIBP and SpO_2. Full operating instructions are given in the Operating Guide supplied with the monitor. You should also always read the instructions and safety guidelines that come with the supplies for this monitor.

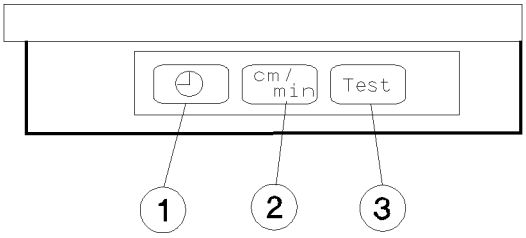
Not all parameters and features detailed in this Quick Reference guide are available on all monitors.



Major Parts

1. Monitor On/Off Switch
2. Monitor On/Off Indicator
3. Recorder Keys
4. Recorder
5. Maternal Parameters
6. Cardio 2 Channel
7. Toco Channel
8. Cardio 1/ Combi Channel
9. Function Key
10. Telemetry Indicator
11. Fetal SpO_2 Parameter
12. Opening Recess
13. Socket for Remote Event Marker
14. Setting Keys
15. Service Socket

Setting Keys



1. *Time and Date Key.* Used when changing the time and date. Press to show the current time in the Cardio 1/Combi and Toco displays, to cycle through the settings to be changed (hours, minutes, day, month and year) and to return to the normal display.

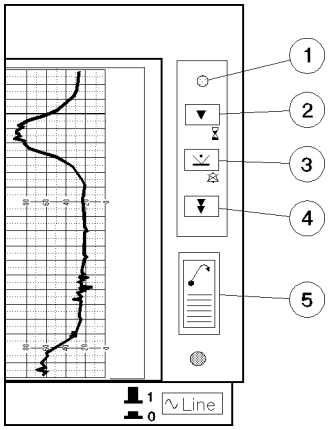
   Use [–] and [+] to change settings.

2. *Paper Speed Key.* Used when changing the paper speed. Press to show the current paper speed in the Cardio 1/Combi display, and to return to the normal display.

   Use [–] and [+] to change settings.

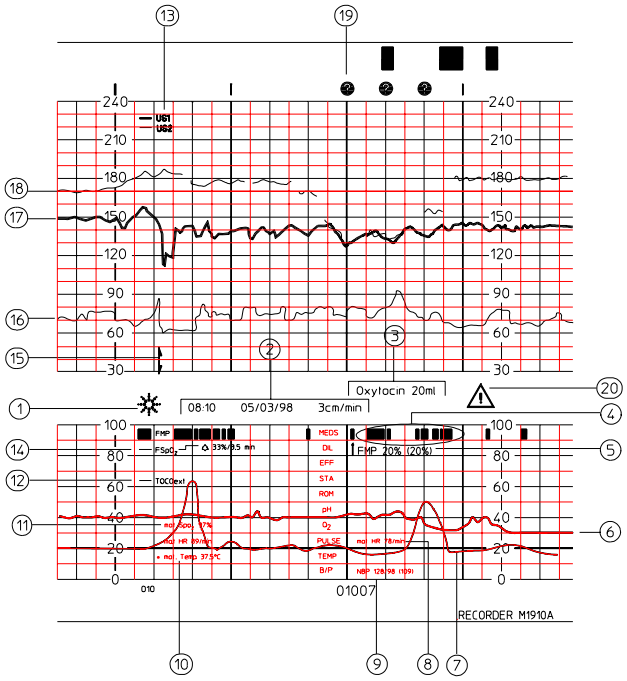
3. *Test Key.* Used to initiate monitor self test.

Recorder Keys



1. *Recorder On/Off Light.* Lit when the recorder is switched on. Flashes when there are five or fewer pages remaining in the pack, or if the paper runs out.
2. *Recorder On/Off Key.*
   Single press – turn recorder on/off.
   2-second press – start NST timer. Recorder must be off.
3. *Event Marker Key.* Press to record an event on the paper. Also use this to acknowledge fetal alerts and maternal alarms.
4. *Paper Advance Key.* Press once to advance the paper automatically to the next fold. Press a second time to stop paper before fold.
5. *Paper-Eject Key.* Press once to unlock the drawer, and then press and hold to remove the paper.

Example Trace



Please note that the appearance of the trace differs slightly from country to country and according to the options you have installed.

1, 2. Company logo, time, date, and paper speed are printed when you begin monitoring and then every 10 minutes.

3. Barcode notes (example text shown).

4. FMP activity blocks.

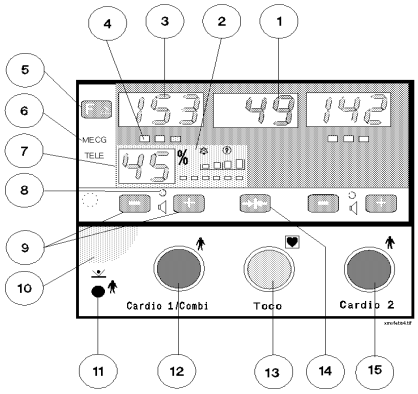
5. FMP statistics. Printed below the FMP activity blocks every 10 minutes.
   - First value: % of detected fetal movements in the last 10 minutes.
   - Value in parentheses: % of fetal movements detected since the recorder was switched on or an ultrasound transducer plugged into the Cardio1/Combi socket.
6. Fetal blood oxygen saturation level ($FSpO_2$).
7. Uterine activity trace. This trace shows 2 contractions.
8. Maternal heart rate.
9. Maternal blood pressure. In this example, systolic blood pressure is 128 mmHg, diastolic blood pressure is 98 mmHg, and mean arterial pressure is 109 mmHg.
10. Maternal temperature (37.5 ºC). An asterisk * indicates that the measurement comes from an external device.
11. Maternal oxygen saturation level of blood (SpO_2) (97%).
12, 13. Monitoring mode. This shows you which parameters are currently being monitored.
14. $FSpO_2$ alarm settings.
15. Event marker arrow.
16. MHR.
17, 18. FHR1 and 2.
19. Cross-channel verification. If two heart rates being measured coincide at any time (that is, if both transducers are recording the same FHR or MHR), this is detected by ccv and ? is printed on the trace paper after approximately 10 seconds.
20. Error sign. Check the digital display on your monitor for the specific error message.

Replacing Paper

Do not use non-Philips paper or paper with sprocket holes intended for HP 8040A/8041A and 8030A/8031A Fetal Monitors. You will invalidate your recorder's warranty.

1. Switch off the Recorder.
2. Push the *Paper Eject Key* and fully open the drawer.
3. Push and hold the *Paper Eject Key* and lift out any remaining paper.
4. Unfold the top page of the new pack of paper.
5. Slide the pack into the tray, with the uterine activity scale on the right.
6. Push the drawer back until it "clicks" closed. Don't push on the paper when closing the drawer.
7. Switch on Recorder.
8. Press and release the *Paper Advance Key* to move the paper automatically to the next fold.

Cardio, Toco and Fetal SpO_2



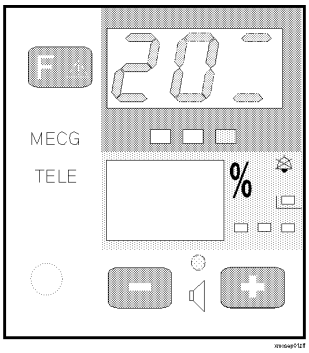
1. *Toco display* shows uterine activity.
2. *Fetal SpO_2 display* shows fetal pulse indicator, signal quality, alarm status, and cross channel verification plus indicator.
3. *Cardio display* shows the FHR.
4. *Signal Quality Indicator* shows the condition of FHR signal:
   - Green (optimum).
   - Yellow (fair to potentially poor).
   - Red (unacceptable).

   Reposition transducer if signal is red for prolonged period.
5. *Function Key.* Used when separating twin traces, switching arrhythmia logic and FMP off and on. Press to show the current setting of Twins Offset, Logic or FMP in the Cardio 1/Combi display, and to return to the normal display. The function key can also be used to turn fetal alerting on and off, and enter $FSpO_2$ alarming (where available).

Cardio, Toco and FSpO2

6. *MECG Indicator* shows when maternal ECG is being measured. (Indicator location different for Series 50 XM.)
7. *$FSpO_2$* value shows fetal oxygen saturation value.
8. *Speaker Lamp* shows which heartbeat comes from loudspeaker.
9. *Volume Keys* set the volume level, select the channel to which you are listening, and set alarms for $FSpO_2$ and heartrate. Also used to switch Twins Offset, Logic and FMP on and off.
10. *Recess* for use when tilting the display.
11. *Remote Event Marker Socket* for connecting remote event marker (15249A).
12. *Cardio 1/Combi Transducer Socket.* You can connect:
    - $FSpO_2$ patient module (M1365A) with either MECG or DECG.
    - Patient module (M1364A) with either MECG or DECG.
    - An ultrasound transducer (M1356A).
    - A US/MECG Combi transducer (M1358A).
    - An MECG transducer (M1359A).
13. *Toco Transducer Socket.* You can connect:
    - An external Toco transducer (M1355A).
    - An IUP transducer (CPJ840J5 or M1333A).
14. *Toco Baseline Key* zeroes the Toco display and trace to 20 units (when monitoring uterine activity externally) or 0 units (when monitoring uterine activity internally)
15. *Cardio 2 Transducer Socket.* You can connect:
    - US transducer (M1356A) MECG transducer (M1359A) Patient module (M1364A)

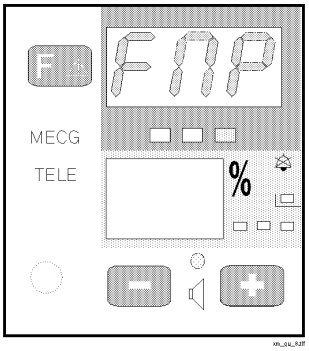
Separating Twin Traces



1. Press F.⚠ and release to display 20.
   The Signal Quality Indicator shows:
   - RED if the traces are NOT SEPARATED.
   - GREEN if the traces are SEPARATED.
2. Press − or + to change the setting.
3. Press F.⚠ several times to return to the normal display.

Fetal Movement Profile

You must connect an ultrasound transducer to the Cardio 1/Combi socket.



1. Press [F.⚠] repeatedly until FMP is displayed.
   The Signal Quality Indicator shows:
   - RED if FMP is OFF.
   - GREEN if FMP is ON.
2. Press [−] or [+] to change the setting.
3. Press [F.⚠] repeatedly to return to the normal display.

Fetal Alerting

You must connect either an ultrasound or a patient module with DECG to one of the two Cardio sockets.

1. Press F. repeatedly until AL is displayed.
   The Signal Quality Indicator shows:
   - RED if fetal alerting is OFF.
   - GREEN if fetal alerting is ON.

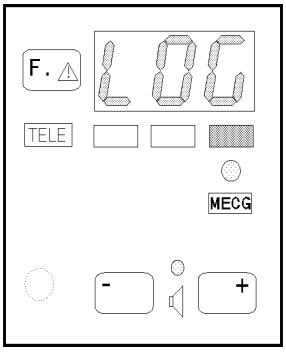
2. Press − or + to change the setting.
   To display the next alert limit setting press →|←.
   Use − and + to change the next alert setting.

Alert Setting	Display
High alert limit Default 150 bpm, 0 = off	--A
Alert delay for high limit Default 60 sec	"-A
Low alarm limit Default 110 bpm, 0 = off	_-A
Alert delay for low limit Default 60 sec	"_A

The monitor retains these settings, even when switched off. They are printed on the recorder if alerting is on.

Arrhythmia Logic

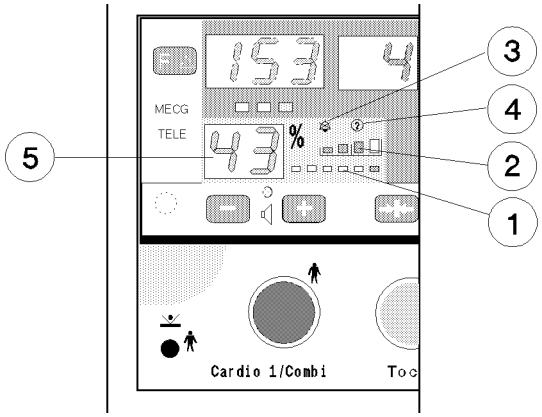
Connect a DECG patient module to Cardio 1/Combi socket.



1. Press F.⚠ repeatedly until LOG is displayed.
   The Signal Quality Indicator shows:
   - RED if logic is OFF (record arrhythmias).
   - GREEN if logic is ON.
2. Press − or + to change the setting.
3. Press F.⚠ once or twice (if Cardio 1 and 2 are being used) to return to the normal display.

When arrhythmia logic is ON, an unexpectedly high variation between successive fetal heartbeats is not recorded on the trace. Recording resumes when successive beats again fall within predetermined limits. This avoids recording artifacts. However, it will not show genuine arrhythmia. When logic is off, ALL recorded fetal heartbeats are shown. If you suspect fetal arrhythmia, switch logic OFF.

Fetal SpO_2



1. **Pulse indicator** - shows when pulsatile signal is received.
2. **Signal quality indicator** - shows how good a signal the monitor is receiving. The more segments that are lit, the better the signal.
3. **Alarm status indicator** - shows whether $FSpO_2$ alarming is switched on or off. The crossed bell shows alarming off.
4. **Cross channel verification plus (CCV+)** - shows if monitor detects an $FSpO_2$ value that might be maternal, or artifacts due to excessive fetal or maternal movement.
5. **Saturation value** - shows level of oxygen saturation in fetal blood.

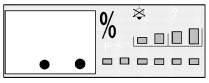
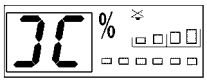
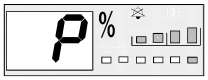
Fetal SpO_2

Changing Alarm Limits

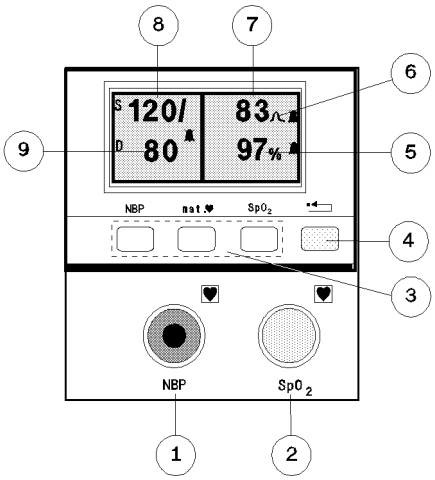
Connect the $FSpO_2$/ECG combined patient module to the Cardio 1/Combi socket.

1. Press [F.⚠] until the $FSpO_2$ display shows AL. Then you can enable (press [+]) or disable (press [−]) the alarm **or**
2. Press [→|←] to access the saturation alarm limit setting.

   The Toco display shows --A, indicating that you are changing the saturation low alarm limit. The $FSpO_2$ display shows the current low limit. There is no high limit.
3. Press [+] or [−] to increase or decrease the $FSpO_2$ saturation alarm limit.
4. Press [→|←] to set the time delay. The Toco display shows '_A, indicating that you are changing the time delay. The $FSpO_2$ display shows the current delay, in minutes.
5. Press [+] or [−] to increase or decrease the time delay in increments of 0.5 minutes.
6. Press [F.⚠] to return to normal monitor function.

Display	Problem	Solution
	Patient module not plugged in.	Plug in patient module.
	Patient module plugged in but sensor not attached.	Check connection of sensor to patient module. Replace patient module or sensor if necessary.
	Sensor has no contact with the patient's skin	Reposition the sensor slightly.
	Pulse indicator bar pulses rhythmically but monitor does not display a saturation value.	Observe the signal quality indicator lights. If you do not obtain a medium to good quality signal (three or four segments lit) after waiting for at least one minute, reposition sensor.

Maternal Parameters



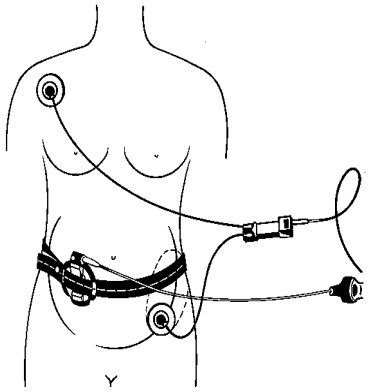
1. *NBP Cuff Socket.* You can connect:
   - An NBP cuff interconnect tubing (M1599A) and cuff (M1574A or M1575A).
2. *SpO_2 Transducer Socket.* You can connect:
   - An SpO_2 transducer (M1940A adapter cable connected to M1191A transducer).
3. *Keys* for operating and setting maternal parameters. They are:
   - NBP Softkey selects modes and alarm limits for NBP.
   - MHR Softkey selects modes and alarm limits for MHR, and freezes MECG wave for recording.
   - SpO_2 Softkey selects modes and alarm limits for SpO_2.

4. *Reset Key (yellow)*.
   - **One short press**
     Acknowledges warning message
     Acknowledges alarm
     Redisplays maternal main screen
   - **One press, held for two seconds**
     Accesses volume and contrast setup screen
   - **Two presses within one second**
     Displays current maternal alarm limits.
5. *SpO_2 Value* indicates current reading for maternal oxygen saturation level.
6. *MHR Icon* indicates measurement source of MHR.
   - indicates heart rate value taken from MECG.
   - indicates pulse rate value taken from SpO_2.
   - indicates average pulse rate value taken from NIBP.
7. *Maternal Heart Rate* shows current heart rate or pulse rate.
8. *Systolic Value* shows the value for the systolic parameter of the most recent noninvasive blood pressure measurement.
9. *Diastolic Value* shows the value for the diastolic parameter of the most recent noninvasive blood pressure measurement.

Maternal ECG Waves

Positioning the Electrodes

Position the electrodes as shown in the picture below:



Displaying and Freezing the ECG Wave

1. Press **mat.** ♥ .
2. Press **Wave** .
3. Press **Freeze** .

Printing the Displayed Wave

1. Turn recorder on.
2. Press **Print** .

This prints a “snapshot” of a three to four wave period.

Acknowledging an Alarm

Press either the yellow key, or the marker key once.

Switching an Individual Alarm On or Off

1. Select the alarm you want to change.
2. Press **On** or **Off** to enable or disable the selected alarm.

Changing a Maternal Alarm

1. Select the alarm you want to change.
2. Press **L Limit** or **H Limit** to select the limit you want to change. SpO_2 has only a low limit alarm.
3. Press ↑ or ↓ to change the selected alarm limit.

Turning ALL Maternal Alarms On or Off

1. Press the yellow key twice within one second to display the power on screen.
2. Press **On** or **Off** to change the status of all maternal alarms.

Maternal SpO_2 Warning Messages

Warning Message	Parameter Display	Audible Indication	Possible Cause	What to Do
None	– – %	No	Transducer or adapter cable disconnected.	Connect transducer or cable.
⚠ **SpO_2 no pulse**	NOP	Yes (if alarming is on)	Pulsation too weak or no pulsation detectable. Transducer incorrectly positioned.	Check patient's pulse. Reposition transducer. Ensure transducer is not on same limb as cuff.
			Patient wearing colored nail polish.	Remove nail polish.
⚠ **SpO_2 low signal**	Normal display	No	Weak signal, SpO_2 less accurate.	Reposition transducer or try a different site.
			Wrong transducer selected.	Use correct transducer.
			Transducer incorrectly applied.	Reapply transducer.
			Patient wearing colored nail polish.	Remove nail polish.
			Photodetector not opposite light emitter.	Reposition transducer.

Maternal SpO_2 Warning Messages

Warning Message	Parameter Display	Audible Indication	Possible Cause	What to Do
⚠ **SpO_2 light interference**	– ? –	No	A light source is so high that the SpO_2 transducer cannot measure SpO_2 or HR.	Remove strong light source, or cover transducer with opaque material.
⚠ **SpO_2 artifacts**	– 0 –	No	Irregular pulse patterns detected, possibly arising from patient movement.	Restrain patient.

NIBP Warning Messages

Warning Message	Situation	Audible Indication	Action Required
⚠ **overpressure**	Cuff pressure increases above 300 mmHg.	Yes (cannot be switched off)	Check to see if cuff is being pressed manually (perhaps by patient movement) and restart the measurement. Cuff deflates automatically.
⚠ **artifacts**	Patient is moving.	Yes (if alarming is on)	Restrain patient movement and restart the measurement.
⚠ **cuff tubing**	Inflation / deflation takes too long.	Yes (if alarming is on)	Check that all tubes are connected properly, not blocked, leaking or defective. Ensure that the correct cuff is being used. Restart the measurement.
⚠ **NBP error**	Tubing obstructed or hardware problem.	Yes (if alarming is on)	Check tubing. Switch monitor off and try measurement again. If problem persists, call service personnel.

Quick Test

The Quick Test takes approximately 15 seconds and tests the basic electronics of the monitor. To carry out the test:

1. Disconnect any transducers from the monitor (and, if appropriate, switch off or disconnect the Telemetry Receiver and any external devices connected to the monitor).
2. Switch on the monitor.
3. Press and release **Test** and check that:
   - The fetal displays flash, and the two halves of the maternal display flash alternately.
   - The recorder on/off light blinks in time with the display.
   - A test pattern is printed.
   - After a few seconds, the monitor performs its power on test.
4. Check the lines in the test pattern to ensure the heating elements on the printer head are operational.

Parameter Test

The Parameter Test tests the signal path to and from the transducer sockets, but not the transducers themselves.

1. Switch on the monitor and the recorder.
2. Connect the appropriate transducer to each socket.
3. Press and hold **Test**. The correct responses are:

Signal	Correct Monitor Response
US Cardio 1	**190** is displayed and printed. Signal Quality Indicator is green. Fetal heartbeat heard from loudspeaker.
US Cardio 2	**170** is displayed and printed. Signal Quality Indicator is green. Fetal heartbeat heard from loudspeaker.
Toco	A signal alternating between **10** and **60** is displayed and printed.
DECG	**200** is displayed and printed. Signal Quality Indicator is green. Fetal heartbeat click from loudspeaker.
MECG	**120** is printed and displayed on the maternal screen. **MECG** is on.
US/MECG Cardio 1	**190** is displayed on the LEDs. **120** is displayed on the maternal screen. **190** and **120** are printed. Signal Quality Indicator is green. **MECG** is on.
Maternal SpO_2	**99%** is displayed and printed. Pulse **120** displayed on LCD screen.
$FSpO_2$	**88%** is displayed and printed.

Acknowledge messages by pressing the yellow key.

Message	Cause and Solution
Err 1	Wrong transducer in either the Cardio 1 Combi or Cardio 2 socket. *Connect the correct transducer.*
Err 2	Wrong transducer in the Toco socket. *Connect the correct transducer.*
Err 4	US/MECG Combi transducer not allowed. *Connect the correct transducer.*
Err 6	Wrong pairing of US/MECG Combi, MECG or DECG transducers. *Remove one of the transducers.*
Err 8	No Dual Ultrasound Twins option. *Remove one of the transducers.*
Err 9	Invalid Telemetry mode. *Check the cable from the Telemetry Receiver.*
Err 16	Wrong pairing of Telemetry and transducers. *Disconnect fetal and Toco transducers or switch off Telemetry Receiver.*
Err 101	$FSpO_2$ patient module defective. *Replace module.*

Message	Cause and Solution
Err 102	Communication error - no connection between $FSpO_2$ patient module and monitor. *Replace module.*
Err 103	$FSpO_2$ sensor defective. *Replace sensor.*
nop	No contact or poor contact between mother and reference electrodes on sides of fetal scalp electrode or spiral electrode detached. *Use a new spiral electrode.*
Err bAt	Battery low or empty of charge. *Change the batteries as soon as possible.*
Err PAP 30-240	Incorrect type of paper loaded. *Load 50-210 paper or change the paper format setting (see Service and Installation Guide).*
Err PAP 50-210	Incorrect type of paper loaded. *Load 30-240 paper or change the paper format setting (see Service and Installation Guide).*
Err 500-600	Technical failure. *Contact Philips Service Engineer or Response Center.*

Message	Cause and Solution
Err 601 ⚠	Paper speed error. Check the speed by timing how long it takes for the paper to advance 1 cm: 60 seconds @ 1 cm/min. 30 seconds @ 2 cm/min. 20 seconds @ 3 cm/min. *Contact your Philips Service Engineer or Response Center if the speed is incorrect.*

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